BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO

IN THE MATTER OF THE APPLICATION OF	)	
PUBLIC SERVICE COMPANY OF COLORADO	)	
FOR APPROVAL OF A NUMBER OF	)	
STRATEGIC ISSUES RELATING TO	)	
ITS DSM PLAN, INCLUDING MODIFIED	)	
ELECTRIC ENERGY SAVINGS AND DEMAND	)	
REDUCTION GOALS, AND REVISED	)	
INCENTIVES FOR THE PERIOD 2015 THROUGH	)	
TO 2020; FOR APPROVAL OF A DISTRIBUTION	)	DOCKET NO.
VOLTAGE OPTIMIZATION PROGRAM	)	13A-0686EG
TOGETHER WITH COST RECOVERY AND	)	
INCENTIVES, AN LED STREET LIGHTING	)	
PRODUCT AND APPROVAL TO INCLUDE	)	
BEHAVIORAL CHANGE PRODUCTS IN THE	)	
COMPANY'S DSM PORTFOLIO AND OF THE	)	
METHODOLOGY TO BE USED TO MEASURE	)	
SAVINGS FROM SUCH PRODUCTS; AND FOR	)	
COMMISSION GUIDANCE REGARDING THE	)	
FACTORS TO BE CONSIDERED AND	)	
APPROPRIATE LEVEL OF THE COMPANY'S	)	
GAS DSM PROGRAM IN THE FUTURE.	)	

Surrebuttal Testimony of
Tim Woolf

On Behalf of the Sierra Club

On the Topic of Setting Energy Efficiency Goals

January 21, 2014

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1. INTRODUCTION AND QUALIFICATIONS

Q. Please state your name, title and employer.

A. My name is Tim Woolf. I am a Vice President at Synapse Energy Economics, located at 485 Massachusetts Avenue, Cambridge, MA 02139.

Q. Have you previously testified in this docket?

A. Yes. I provided answer testimony on October 16, 2013.

Q. On whose behalf are you testifying in this case?

A. I am testifying on behalf of the Sierra Club.

Q. What is the purpose of your testimony?

A. The purpose of my testimony is to respond to the rebuttal testimony of the Public Service Company of Colorado (PSCo or the Company), particularly the rebuttal testimony of Debra Sundin and James Petersen.

2. SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

Q. Please summarize your primary conclusions.

A. My general conclusion is that the Company's rebuttal testimony suggests that it has lost sight of the real value of energy efficiency to its system and its customers. The Company's approach to setting its efficiency goals is inconsistent with Colorado state law, inconsistent with sound efficiency planning practices, and will deprive Colorado electricity and gas customers of hundreds of millions of dollars of savings. In particular:

- Efficiency Savings Potential: There is clearly more efficiency potential available than what is assumed in the Company's proposed goals, based upon my evidence, as well as the evidence of other parties, provided in answer testimonies.

- The RIM Test: The Company is placing way too much emphasis on the results of the RIM test in setting its energy efficiency goals. The RIM test is inappropriate and misleading, and should never be used to set energy efficiency goals. Other practices should be used to address rate impact concerns.

- The Real Rate Impacts: The actual rate impacts from the goals proposed by the Company will be very small, and bill savings experienced by the majority of electricity customers will mostly or entirely offset any impact. The rate impacts from the Sierra Club's proposed goals will also be very small, and should not be used as a reason to deprive customers of the additional value available from the higher goals.

- The Real Benefits of Efficiency: The energy efficiency programs provided by the Company offer significant cost savings to electricity customers, possibly ranging from roughly $1.0 billion (under the Company's goals) to $1.4 billion (under the Sierra Club goals), and these cost savings should be recognized when setting energy efficiency goals.

- Avoided Emissions: The Company has not considered the value of reduced air emissions when screening energy efficiency resources, despite the requirement to do so by Colorado law. Reductions in air emissions will significantly reduce future electricity and gas system costs, in addition to providing environmental and health benefits to the state and the region. I estimate that the benefits of avoided CO_2 emissions could increase the cost savings of the efficiency programs (relative to those cited above) by roughly $0.5 billion (under the Company's goals) to $0.9 billion (under the Sierra Club's goals).

Q. Please summarize you primary recommendations.

A. I offer the following recommendations:

- Efficiency Goals: The Commission should reject the Company's proposed efficiency goals, and instead require the Company to adopt the Sierra Club's goal of reducing electric sales through efficiency programs by 1.6 percent per year by 2017 and 2.0 percent per year by 2020.

- Efficiency Screening: The Commission should find that the RIM test should have no role in determining the cost-effectiveness of energy efficiency, consistent with Colorado statute. The Commission should also find that rate impacts should be considered in a comprehensive manner when setting future energy efficiency goals.

This would include meaningful, quantitative analyses of long-term rate impacts, bill impacts, and participation rates.

- Emissions Reductions Value: The Commission should require the Company to include its best estimate of the value of reduced emissions in all future analyses of energy efficiency cost-effectiveness. For the purpose of setting energy efficiency goals in this docket, the Commission should require the Company to use my recommended value of CO_2 emissions.

- Non-Energy Benefits: The Commission should require the Company to use more accurate estimates of non-energy benefits, as described in more detail in my answer testimony.

- Decoupling: The Commission should open a separate docket to investigate the advantages and disadvantages of revenue decoupling as a means to align the Company's financial incentives with the state's energy policy goals.

3. THE SIERRA CLUB SAVINGS GOALS ARE ACHIEVABLE

Q. Has the Company properly modeled the impacts of the Sierra Club goals in its rebuttal testimony?

A. No. In his rebuttal testimony, Mr. Petersen used the wrong amount of energy savings for the Sierra Club goals. Table 1 presents the correct amount of energy savings goals that I am proposing in this docket.[1]

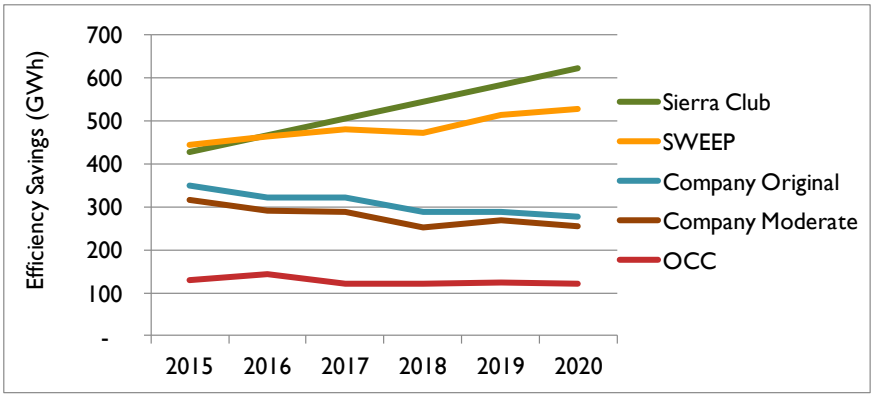
Table 1. Synapse Proposed Energy Efficiency Savings Goals

	2014	2015	2016	2017	2018	2019	2020
Sierra Club Proposal (% of sales)	1.3%	1.4%	1.5%	1.6%	1.8%	1.9%	2.0%
Sierra Club Proposal (GWh)	384	427	467	506	544	582	621
Company Proposal (GWh)	384	349	321	322	288	288	276

Figure 1 presents my actual proposed energy savings goals, as well as the energy savings goals of the Company and some other parties to this docket. As indicated, I am proposing the highest energy savings goals among all the parties.

[1] These savings goals do not include the savings from the proposed DVO program, which would be additive to these.

Figure 1. Proposed Energy Efficiency Savings Goals (GWh)



Q. Has the Company acknowledged and corrected for this mistake?

A. Yes, the Company has acknowledged and corrected for this mistake in evaluating the Sierra Club's proposed goals (Exhibit TW-28, p. 3, Discovery Response SC7-3, and p. 4-5, Discovery Response SC8-1). The Company's updated analysis indicates that the Sierra Club's proposed goals will result in significantly greater net benefits than indicated in Mr. Petersen's rebuttal testimony, with estimated net benefits of $1,403 million under the Utility Cost test (Exhibit TW-28, p. 3, Discovery Response SC8-1). My analysis below provides the savings, costs and benefits of the Sierra Club goals using the corrected information.

Q. Are you confident that the Sierra Club goals are reasonable and achievable?

A. Yes. In my answer testimony I provided the following reasons why my proposed goals are reasonable and achievable:

- The KEMA DSM potential study overlooked several important energy efficiency measures, and applied conservative assumptions regarding the costs and adoption rates of energy efficiency programs.
- Experience has demonstrated that efficiency potential studies frequently understate the full extent of potential efficiency savings.
- The Company's current programs are highly cost-effective and could be expanded to serve more customers and achieve greater savings.
- Several states have already achieved higher levels of efficiency savings than my proposed goals, and currently have goals to continue to do so; despite the new

federal lighting standards, and despite the fact that they have achieved much higher levels of efficiency savings than Colorado in recent years.

Q. How did the Company respond to your answer testimony on these points?

A. In his rebuttal testimony Mr. Petersen dismisses my comparison to efficiency savings and goals in other states. In particular, he states that "utilities operating in other states face different regulatory environments, have differing histories of DSM achievement, and may have customer populations of varying compositions" (Petersen Rebuttal Testimony, p. 16).

Q. Is this response valid?

A. No. First, I wish to reiterate that all three states for which I provide information (Massachusetts, Rhode Island and Vermont) have *already* achieved efficiency savings of two percent per year, and have goals for achieving *higher* levels of savings. Therefore, my proposed goals for Colorado are well below the goals of those states.

Second, the Company's main argument for lower efficiency goals is that savings will be harder to achieve in the future as a result of historic efficiency savings in Colorado and the federal lighting standards. However, the three states I compare to Colorado have achieved higher levels of historic efficiency savings relative to Colorado, and therefore it should be easier for PSCo to achieve my proposed goals. Furthermore, these three states are also facing the same federal efficiency standards as Colorado, and yet they expect to be able to achieve greater savings than they have in the past and much greater savings that the Company's goals.

Third, it may be true that the different states have different customer populations of varying compositions. However, this does not mean that different states have such significantly different levels of efficiency potential. There are so many cost-effective efficiency measures available for so many end-uses and so many customer types that efficiency savings opportunities are likely to be as abundant in Colorado as in most any other state.

Fourth, it is true that different states have different regulatory environments regarding the implementation of ratepayer-funded energy efficiency programs. In my view, different

regulatory environments are the main reason that states have achieved such different levels of efficiency savings to date. However, the regulatory environment in Colorado should not be seen as a barrier to energy efficiency goals. The current legislation in Colorado is very supportive of energy efficiency: requiring that utilities use energy efficiency to reduce costs to customers and to reduce air emissions (CRS 40-3.2-101); to reduce the net present value of revenue requirements (CRS 40-3.2-104(1)); and to implement cost-effective programs, accounting for non-energy benefits and the value of reduced emissions (CRS 40-1-102(5)). Furthermore, the Commission has a great deal of control over the regulatory environment in Colorado. The current docket provides the Commission an important opportunity to influence that regulatory environment. I recommend that the Commission adopt my proposed efficiency savings goals, in order to provide a supportive regulatory environment and to make it clear that energy efficiency programs should be implemented in a way that maximizes benefits to customers.

Q. Should the Commission be concerned that your proposed goals might not be fully achievable?

A. No. On this point it is useful to consider the risk associated with two potential scenarios. In the first scenario, assume that the Commission sets the efficiency goals "too high," i.e., the Company cannot achieve them, despite a good faith effort. In this case, the efficiency goals are not achieved, but there is little or no harm done to customer or the Company (i.e., the Company does not experience any financial harm). In the second scenario, assume that the goals are set "too low," i.e., that the Company could have achieved higher cost-effective savings levels but did not. In this, case the customers are harmed by being deprived of the net benefits of energy efficiency. I estimate above that customers could be deprived of roughly $500 million (without accounting for CO_2 costs) to $800 million (with accounting for CO_2 costs) by choosing an energy efficiency goal that is too low. In sum, the risk of choosing a goal that turns out to be too high is negligible, but the risk of choosing a goal that turns out to be too low is significant.

4. THE RIM TEST SHOULD NOT BE USED IN SETTING EFFICIECY GOALS

Q. Why is it important to clarify the role of the RIM test in setting efficiency goals?

A. In its rebuttal testimonies, the Company has made it clear that it believes that rate impacts should be an important factor limiting the magnitude of the efficiency goals. Concerns about rate impacts are cited repeatedly in the testimonies of Ms. Sundin and Mr. Petersen. (See, for example, Rebuttal Testimony of Sundin, pages 4, 12, 13, 14, 20, 30, 54, 63, 66; and Rebuttal Testimony of Petersen, pages 8, 9, 14, 15, 17.) In my view, the issue of rate impacts has emerged as one of the most important issues defining this docket, and it is essential that the Commission and other parties be aware of the problems associated with the RIM test.

Q. Are rate impacts an important consideration in setting energy efficiency goals?

A. Rate impacts may be an important consideration in setting efficiency goals. However, rate impacts should not be analyzed using the RIM test, for several reasons. First, the RIM test is inappropriate for determining the cost-effectiveness of energy efficiency resources. Second, the RIM test is misleading and often misunderstood. Third, the results of the RIM test are sometimes incorrect. Finally, the results of the RIM test do not provide meaningful information for understanding the real rate impacts of efficiency programs. I elaborate on these points below. I provide a much more meaningful option for analyzing the rate impacts of energy efficiency programs, in Section 5.

Q. Why is the RIM test inappropriate for determining cost-effectiveness?

A. There are several reasons why it is inappropriate to use the RIM test for determining cost-effectiveness. First, it is inconsistent with Colorado statutes pertaining to energy efficiency planning. CRS 40-3.2-104(1) states that "it is the policy of the state of Colorado that a *primary goal* of electric utility least-cost planning is to minimize the *net present value of revenue requirements*" (emphasis added). The Utility Cost test indicates the net present value of revenue requirements that would result from energy efficiency activities, yet the Company repeatedly uses the results of the RIM test to justify its proposed energy efficiency goals and to reject higher goals proposed by other parties.

In addition, CRS 40-1-102(5) defines the costs and benefits that should be included in evaluating the cost-effectiveness of energy efficiency resources. It includes a list of the relevant costs to be included, but it does not include the costs associated with lost revenues, nor does in mention rate impacts in any way. The Company's heavy reliance upon the results of the RIM test in setting its efficiency goals is directly in conflict with this statutory definition of cost-effectiveness and the statutory goal for utility resource planning.

Q. Are there other reasons why it is not appropriate to use the RIM test?

A. Yes. I list several reasons in my answer testimony on page 28. I wish to emphasize one of them here because it is so essential in understanding the problems with the RIM test. The additional costs included in the RIM test, relative to the Utility Cost test, are the revenues that are supposedly lost as a result of reduced energy consumption. These lost revenues are a result of the need to recover existing, fixed costs through fewer sales because the sales are lower than they would have been in the absence of the efficiency measures. Thus, the additional costs that are included in the RIM test *are not new costs;* they *are not caused by the energy efficiency programs*. They are "sunk" costs. Sunk costs should not be used in determining whether to invest in future projects because they are incurred regardless of whether the future projects are undertaken. Application of the RIM test is a violation of this fundamental principle of micro-economics.

Q. Are there other reasons why the Commission should be concerned with the way that the Company has relied so heavily upon the RIM test?

A. Yes. Essentially every state in the country has rejected the use of the RIM test as the primary test to use for determining energy efficiency cost-effectiveness (see Ex. TW-4, p.14). The Commission should not set efficiency goals based upon an analysis that is directly in conflict with standard industry practice throughout the United States.

Q. Why do you say the RIM test is misleading?

A. The RIM test results presented by the Company imply that customers will be required to pay additional costs as a result of the energy efficiency programs. For example, Table JAP-3 in Mr. Petersen's Rebuttal Testimony indicates that the net benefits under the RIM test are negative, i.e., that energy efficiency will increase costs to customers by the

amounts presented. This is misleading because the efficiency programs will not result in *higher* costs; they will result in *lower* costs. The extent to which costs are reduced is indicated by the net benefits of the Modified Total Resource Cost (MTRC) test and the Utility Cost test.

Furthermore, the Company frequently refers to the results of the RIM test as "ratepayer impacts" (Sundin Rebuttal Testimony, pages 14, 15, 23, 24, 29). This reference suggests that these are the primary impacts on customers of the efficiency programs, which is misleading. The MTRC and the Utility Cost test results provide much better indications of the "ratepayer impacts" of energy efficiency, as these tests indicate the extent to which costs to ratepayers will be reduced by energy efficiency.

Q. Why do you say the RIM test is inaccurate?

A. As discussed on page 28 of my answer testimony, in estimating the lost revenues to be used in the RIM test, the Company does not account for its ability to use generation that is freed-up by energy efficiency to increase off-system sales, or reduce off-system purchases (Exhibit TW-2, p. 17, Discovery Response SC2-39). Consequently, the Company may have overstated the lost revenues, and therefore the magnitude of the RIM test results.

Q. Why do you say the RIM test does not provide meaningful information?

A. Despite its name, the RIM test does not provide any meaningful information that the Commission can use to assess the likely rate impacts of energy efficiency. Presenting RIM test results (in terms of millions of dollars) does not provide any context to draw conclusions about the likely magnitude of rate impacts. In order to understand the magnitude of rate impacts it is necessary to put the impacts in terms of ¢/kWh, dollars per customer per month, percent increase in rates, percent increase in bills, or some other measure that puts the impacts in context. In the following section I provide some recommendations for how to address rate impacts in a way that is much more meaningful than the results of the RIM test.

Furthermore, the results of the RIM test do not address the core issue raised by rate impacts of energy efficiency: customer equity. The central concern about rate impacts in

this context pertains to those customers who do not participate in the efficiency programs (the non-participants). In general, program participants will experience reduced bills, despite increased rates, whereas program non-participants may experience increased bills as a result of increased rates. In fact, Colorado law requires the Company to consider impacts on program non-participants when evaluating energy efficiency programs (CRS 40-3.2-104(4)).

The RIM test provides no information to help understand the extent to which customers participate in the efficiency programs, and therefore it provides no information regarding the extent to which efficiency savings offset increased rates.

In order for the Commission to fully assess the impact on customers from increased rates, it is necessary to answer three key questions:

- How much will rates increase (in terms of ¢/kWh or percent of bills) as a result of the efficiency programs?
- How much will bills be reduced for the efficiency program participants?
- What portion of customers is likely to participate in the efficiency programs and thereby experience lower bills?

The RIM test provides *no information* to help answer these questions.

Q. How should rate impacts be considered in setting energy efficiency goals?

A. As described on pages 29 and 30 of my answer testimony, proper consideration of rate impacts should include comprehensive, quantitative analyses of rates, bills, and program participant impacts of the efficiency goals. Note that the State Energy Efficiency Action (SEE Action) Network sponsored by the US Department of Energy and Environmental Protection Agency made similar recommendations in a recent white paper (see Ex. TW-30; *Analyzing and Managing Bill Impacts of Energy Efficiency Programs: Principles and Recommendations*, SEE Action Network, July 2011.)

In the following section I provide some examples of how to quantitatively address the rate impacts of the efficiency goals proposed in this docket, based on information available in this docket.

5. A BETTER WAY TO ADDRESS RATE IMPACTS

Q. Has the Company provided any estimates of the rate impacts of its proposed energy efficiency goals, besides its RIM analyses?

A. In response to Discovery Request SC6-25, the Company provided estimates of the rate impacts of several different sets of energy efficiency goals. However, these are short-term rate impacts because they include only the period of 2014 – 2020 when the costs will be incurred. The Company's estimates did not include the later years when customers will be experiencing savings from the efficiency measures installed from 2014 through 2020. A better way to indicate the rate impacts of efficiency programs is to calculate the long-term impacts over the period while the efficiency savings are occurring.

Q. Have you prepared any estimates of the long-term rate impacts of the proposed energy efficiency goals?

A. I have prepared a set of high-level, rough estimates of long-term rate impacts, based upon information provided by the Company. My estimates are for the residential rates only (R Rate Schedule), but I expect that the rate impacts for other customer classes would not be significantly different.

In sum, I find the following:

- Company Goals. The long-term rate impacts of the Company's proposed energy efficiency goals are likely to be negligible because they do not require significant increases in budgets relative to current plans for efficiency budgets. In other words, if the Commission were to adopt the Company's proposed goals in this docket, then customers would experience negligible changes to rates relative to the Company's current forecast of electricity rates. This includes the impacts of the efficiency program costs and the recovery of lost revenues associated with those programs.

- Sierra Club Goals. The long-term rate impacts of the Sierra Club's proposed efficiency goals are likely to be on the order of one percent or less. In other words, if the Commission were to adopt the Sierra Club's proposed goals in this docket, then customers would experience rate increases of roughly one percent or less, relative to current forecasts of electricity rates. Again, this includes the impacts of

the efficiency program costs and the recovery of lost revenues associated with those programs. It is also based upon the Company's assumptions regarding the costs of achieving the Sierra Club goals, which are too high, as discussed above.

Q. Please provide a brief description of how these rate impacts were calculated.

A. The rate impacts were calculated using information provided by the Company in Discovery Response SC6-25, Attachment SC6-25.A1 (Exhibit TW-35). In particular, I used the "Rates with Future Energy Efficiency (2015-2020)" table.

I began by breaking out the components of the rates for each scenario, using the Company's assumptions for the impacts of the efficiency spending and the recovery of lost revenues. I then estimated the difference in rates (in ¢/kWh) between the rate forecast for the Company's proposed goals and the rate forecast under current efficiency plans. These were used to estimate rate impacts (in percentage terms) between the Company's proposed goals and the current efficiency goals. Finally, I performed the same calculations for the Sierra Club goals.

To calculate the average long-term rate impacts, I used the same study period that the Company used in its cost-effectiveness analysis: 14 years. I assume that the efficiency spending component of the rates would continue through 2020 only, and that the lost revenue component would last through the study period. The average long-term rate impacts equals the average rate impacts across this study period.

Q. Do you think these are realistic estimates of likely rate impacts?

A. It is important to emphasize that these estimates are rough approximations, and could be improved with additional information and time. Any estimate of rate impacts should account for the downward pressure on rates resulting from energy efficiency, including: reduced rates as a result of a lower-cost generation mix, avoided transmission and distribution costs, and avoided environmental compliance costs. I did not have sufficient information to make this calculation. Therefore, my estimates overstate the likely rate impacts by omitting this important effect. Nonetheless, they are reasonable estimates that

help put the question of rate impacts in context. They are much more realistic and meaningful than the results of the RIM test.

Q. How will customers be affected by these rate impacts?

A. All customers will be affected by this type of rate impacts. In other words, all customers will experience rate impacts regardless of whether they participate in efficiency programs.

Q. How will customers' bills be affected by these rate impacts?

A. The bill impacts will vary depending upon efficiency program participation. Customers who do not participate in any efficiency program will see their bills increase by approximately the same amount as the rate increases, all else being equal. Customers who do participate in an efficiency program will see these rate impacts offset by the reduction in consumption due to the efficiency savings. The results of the Utility Cost Test provide an indication of the extent to which all customers on average will see lower bills, despite the increased rates.

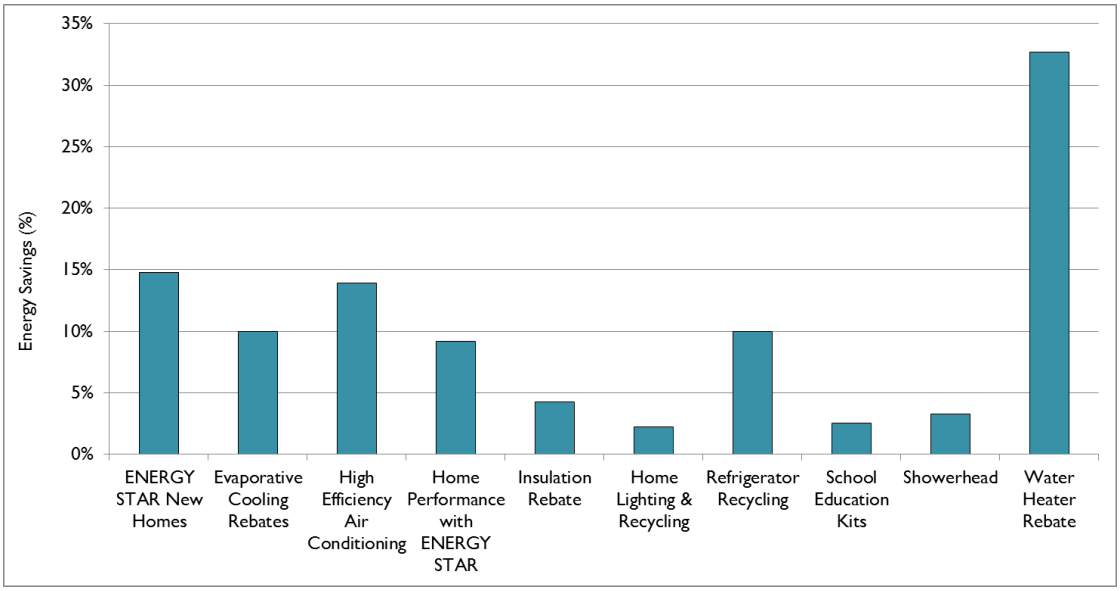
Q. Can you provide an indication of the extent to which participants experience reduced bills from the efficiency programs?

A. Yes. The Company's 2012 DSM Annual Report provides results of actual energy savings resulting from the efficiency programs delivered in that year. This report indicates that residential customers who participated in energy efficiency programs reduced their electricity consumption by roughly 2 percent to 33 percent. (Xcel, 2012 Demand-Side Management Annual Status Report, page 11, Table 4b: 2012 Electric Program Achievements and Expenditures.[2]) Figure 2 presents a summary of the reduction in electricity consumption that customers experienced in 2012 from participation in the Company's programs.[3]

[2] Available at: http://www.xcelenergy.com/staticfiles/xe/Regulatory/Regulatory%20PDFs/CO-DSM-2012-Annual-Status-Report.pdf

[3] The percent savings were estimated by assuming an average residential monthly consumption of 650 kWh.

Figure 2. Energy Savings From 2012 Residential Efficiency Programs



While the information in Figure 2 is for 2012, it is important to recognize that customers have been experiencing comparable efficiency savings from the programs offered over previous years as well.

Q. Is it important to consider customer participation in the efficiency programs?

A. Yes. When considering potential rate impacts from energy efficiency programs, it is absolutely essential to also consider the extent of energy efficiency program participation. Customers who participate in efficiency programs can offset some or all of the increased rates through reduced consumption. If the Company is able to reach a large portion, or even a majority, of its customers through energy efficiency programs implemented over multiple years, then the rate impacts will be significantly mitigated. Furthermore, increasing the efficiency savings goals as I am recommending will broaden the availability of energy efficiency measures and allow the Company to serve more program participants, further mitigating the rate impact.

Q. Can you provide an indication of the extent to which customers will participate in the energy efficiency programs?

A. Ideally, the Company should keep comprehensive data on participation rates in its energy efficiency programs for annual reporting purposes, for planning purposes and for the purposes of setting efficiency goals. The Company has not done this to date (Exhibit TW-29, p. 3, Discovery Response SWEEP5-15). I recommend that the Commission direct the

Company to collect more comprehensive information on efficiency program participation rates in the future.

In the absence of comprehensive participation data, I provide some information here that is useful.

- The energy efficiency programs offered by the Company to date have provided efficiency savings to a large majority of customers (PSCo Demand-Side Management Annual Reports, 2009 - 2013). Many of these participants were in the residential lighting program, which resulted in roughly two percent reduced consumption per participant on average. Customers also participated in other programs with the higher savings levels indicated in Figure 2.
- The programs offered in the 2014 through 2020 period will serve many additional customers, on the order of hundreds of thousands each year, in a variety of programs.
- Increased savings goals will result in increased customer participation rates.
- Many customers will experience efficiency savings as a result of spillover and market transformation effects from programs installed in the past.[4]
- The DVO program will help all customers reduce their electricity consumption. If the DVO program is approved, 100 percent of customers can be expected to see consumption reduced by 1.8 percent on average (Exhibit TW-2, p. 12, Discovery Response SC2-23).

In sum, it is safe to conclude that by 2020 (a) all customers will reduce their own individual consumption by roughly 1.8 percent because of the DVO program; (b) the vast majority of customers will reduce individual consumption by an additional two percent as a result of participation in the lighting program; and (c) many customers will reduce

[4] The term "spillover" refers to the situation where some customers adopt efficiency measures as a result of the program activities, without actually participating in the program or requiring a financial incentive. The term "market transformation" refers to the situation where certain inefficient end-uses are replaced completely by more efficient ones as a result of the efficiency program.

individual consumption by even greater amounts from participation in the other efficiency programs.

Q. Are there other ways that customers can lower their bills through demand-side management programs?

A. Yes. The Company's demand response programs offer customers another opportunity to reduce their electric bills. Demand response programs typically result in little or no energy savings because they are focused on peak savings and therefore typically result in reduced rates. Therefore, demand response programs can reduce rates for all customers, and reduce bills even further for those customers that participate in them.

While I did not address the Company's demand response programs in my answer testimony, I do support its demand response goals, primarily because demand response makes economic sense, but also because it will lower electricity rates and bills.

Q. What should the Commission conclude from all of this information on rate, bill and participant impacts of the energy efficiency programs?

A. This information leads to two key findings. First, the long-term rate impacts from the efficiency programs are likely to be modest, regardless of which efficiency goals the Commission approves. Second, these rate impacts are likely to be more than offset by reduced electricity consumption for many, many customers, leading to lower utility bills overall for the vast majority of customers.

In sum, the rate impacts of the efficiency programs should not be used as a reason to constrain the efficiency goals established by the Commission in this docket. I address this issue further in the final section of my testimony.

Q. Are there other ways to address concerns about rate impacts, besides limiting the efficiency goals?

A. Yes. If the Company or the Commission are concerned about the rate impacts of energy efficiency programs, there are much better ways to address those concerns than what the Company has proposed. One option is to investigate ways to reduce the costs of the efficiency programs. For example, many states are investigating opportunities to use

alternative, third-party funding sources to help offset the amount of funding required from ratepayers.[5]

Another option is to increase program participation rates. Customers who participate in the programs will experience reduced bills, thereby offsetting the rate impacts. There are many ways to increase program participation rates, for example:

- The Company can specifically design programs to address all relevant end-uses, and serve all customer types.
- The Company can specifically design programs to better serve hard-to-reach customer types, such as small businesses, low-income customers, and other customer types that are found to participate at relatively low levels.
- The Company can increase its energy efficiency budgets and goals, to increase the breadth of customer coverage.
- The Commission can require the Company to meet specific participation goals, alongside the energy savings goals, to ensure a breadth of customer coverage.
- The Commission can include participation goals in designing the Company's shareholder incentive mechanism, to provide the Company with a clear financial incentive to increase the breadth of customer coverage.

All of these options offer much more meaningful and thoughtful opportunities to address concerns about rate impacts, and they ensure that customers will be well-served by the efficiency programs, relative to the Company's recommendation to blindly slash savings goals.

[5] See Ex. TW-31, State Energy Efficiency Action Network, *Energy Efficiency Financing Program Implementation Primer*, Financing Solutions Working Group, January 2014.

6. A LOOK AT THE REAL ISSUES AT STAKE HERE

Q. You have mentioned that the Company has given too much attention to rate impact concerns. Are there issues that the Company has not given sufficient attention to?

A. Yes. The Company has dramatically downplayed the extent to which energy efficiency reduces electricity costs to customers. The primary reason for implementing energy efficiency is to reduce electricity system costs, which will reduce utility revenue requirements and reduce customer bills. In its rebuttal testimonies, the Company has focused mostly on the threat of rate impacts, but it has not given due consideration to the extent to which energy efficiency can reduce costs.

In its rebuttal testimonies, the Company estimated the costs, benefits, net benefits, and benefit-cost ratios (BCRs) associated with their proposed energy efficiency goals, as well as with the goals proposed by other parties in this case. This information is critical for the purpose of setting efficiency goals, and warrants additional attention.

Q. Are the energy efficiency programs proposed by the Company relatively low-cost?

A. Yes. The Company presents the cost of saved energy in terms of $/GWh-yr, which is calculated by dividing the annual cost of efficiency by the annual savings. I have used the Company's estimates to put the cost of saved energy into a more useful form: the levelized cost of saved energy. This is a conventional means of accounting for the cumulative savings of the energy efficiency, as well as the time value of money, over the full lifetime of the energy efficiency activities.[6]

Table 2 presents the cost of saved energy (CSE) assumed by the Company in its analysis. It includes the cost used for the Company's proposed goals, as well as the cost used for the other proposed goals, both in terms of $/GWh-yr and in terms of levelized $/MWh.

[6] The cost of saved energy is calculated using the following formula: CSE=annual cost*CRF/annual savings. The CRF is a capital recovery factor calculated using the following formula: CRF=((DR*(1+DR)^ML)/((1+DR^ML)-1), where ML=measure life, and DR=discount rate. I used the Company's assumptions for the discount rate (7.47 percent) and measure life (14 years) from Ex. JAP-3.

Table 2. Cost of Saved Energy Under the Company's Assumptions

	2015	2016	2017	2018	2019	2020	2015-2020
Company's Goals:							
CSE ($/GWh-yr)	$210,343	$222,271	$212,758	$209,233	$222,476	$222,704	$216,410
Levelized CSE ($/MWh)	$23.3	$24.6	$23.6	$23.2	$24.7	$24.7	$24.0
Sierra Club's Goals:							
CSE ($/GWh-yr)	$327,971	$339,739	$323,927	$313,314	$336,443	$336,015	$329,687
Levelized CSE ($/MWh)	$36.4	$37.7	$35.9	$34.7	$37.3	$37.3	$36.6

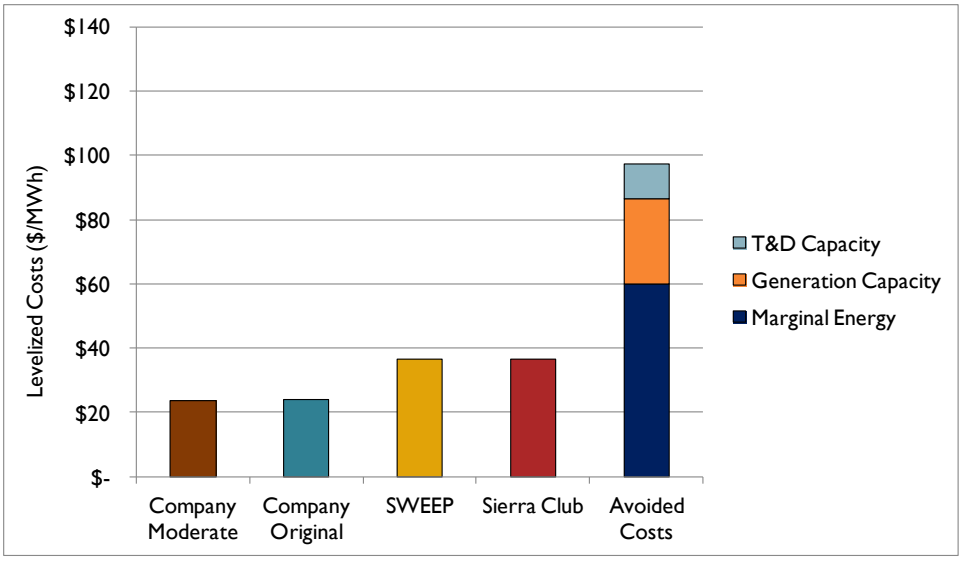
Q. Are these estimates of the cost of saved energy reasonable?

A. The cost of saved energy assumed for the Company's goals appear to be reasonable, as they are based on PSCo's historic experience. However, the cost of saved energy assumed for the Sierra Club goals are unreasonably high. First, achieving higher savings goals does not necessarily cost more on a dollar-per-MWh basis, due to economies of scale in program delivery. Second, the Company assumptions for the cost of saved energy required to achieve of the Sierra Club goals is roughly 50 percent higher than the cost required to achieve the Company's goals. This is an unreasonably high increase in the cost of energy efficiency for simply scaling up existing, relatively mature programs. Consequently, all of the Company's estimates of the net benefits of achieving my goal (discussed further below) understate the actual net benefits of my proposal.

Q. How does the cost of saved energy compare to the cost of supply-side resources?

A. One advantage of using levelized costs of saved energy is that it allows for a direct comparison between energy efficiency and supply-side resources. Figure 3 presents the Company's assumptions for the cost of saved energy, for each of the goals proposed by different parties, relative to the Company's updated estimates of avoided costs over time. (The Company's updated estimates of avoided costs are from Discovery Response SC6-21, Attachment SC6-21.A1 (Exhibit TW-34).) As indicated, the cost of energy efficiency is significantly lower than the cost of supply-side resources - even with the Company's assumptions for meeting the SWEEP and Sierra Club goals at an unreasonably high cost of saved energy.

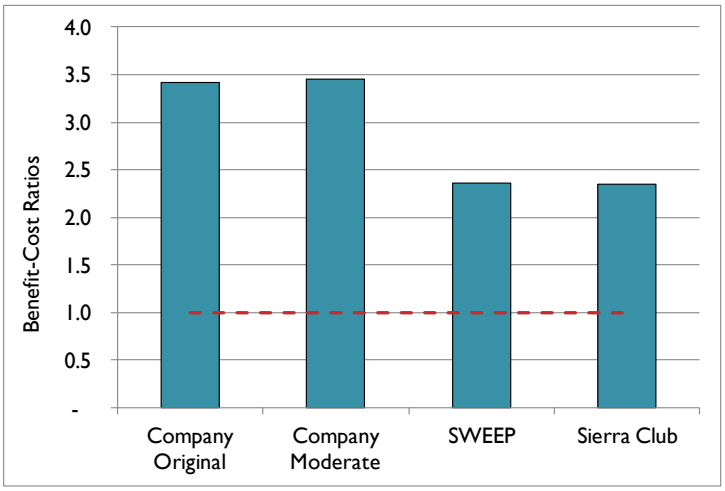
Figure 3. Levelized Cost of Saved Energy Relative to Avoided Costs ($/MWh)



Q. Please summarize the benefit-cost ratios associated with the proposed energy savings goals.

A. Figure 4 presents the benefit-cost ratios associated with the different energy savings goal proposals, for the results of the Utility Cost test. As indicated, the Sierra Club goals are expected to be very cost-effective, with a benefit cost ratio of 2.3. This means that for every dollar spent by the Company, it can reduce its costs by more than two dollars. These savings will be experienced directly by customers in terms of lower revenue requirements and lower bills on average. The benefit-cost ratio would be even higher for the Sierra Club goal if the Company were to use a more reasonable assumption for the cost of saved energy associated with that goal.

Figure 4. Benefit-Cost Ratios of Several Goal Proposals

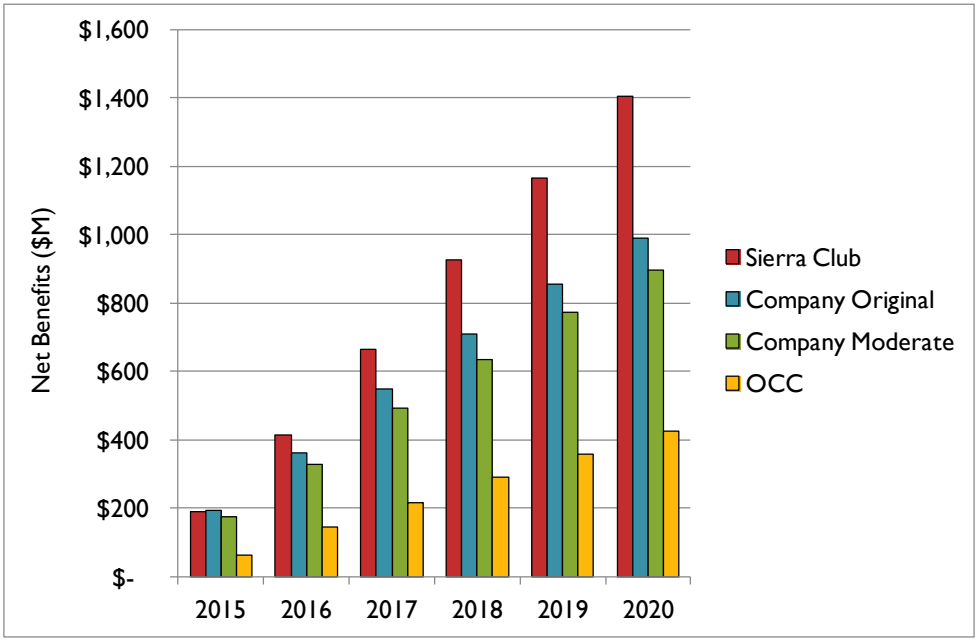


Also, as discussed above, I believe that the Company has overstated the cost of saved energy for the Sierra Club and SWEEP goals. With more reasonable values of those costs, the benefit-cost ratios would be even higher for the Sierra Club and SWEEP scenarios.

Q. Please summarize the net benefits associated with the proposed energy savings goals.

A. Figure 5 presents the net benefits resulting from the proposed energy savings goals, in millions of present value dollars, for the results of the Utility Cost test. First, note that all of the proposed energy savings goals result in a significant reduction in electricity costs, ranging from $424 million to $1.4 billion. Second, note that the net benefits associated with the Sierra Club proposed goals are significantly higher than those associated with the Company's proposed energy savings goals. In fact, under the Company's moderate proposed goals, its customers would be deprived of net savings of roughly $500 million, relative to the Sierra Club goals. Under the OCC's proposal, customers would be even worse off; they would be deprived of net savings of roughly $979 million dollars, relative to the Sierra Club proposed goals.

Figure 5. Cumulative Net Benefits – Utility Cost Test ($ millions)



Q. Why have you focused on the results of the Utility Cost test in your discussion above?

A. The Utility Cost test provides the simplest, most direct estimates of the likely impacts on customers. It includes only those costs incurred by the utility and those costs avoided by the utility, and therefore it indicates the impacts on revenue requirements and the impacts on average bills. In my view, the results of this test present the most meaningful indication of the "ratepayer impacts" of efficiency programs. Furthermore, focusing on this metric is consistent with Colorado law, which states that the primary goal of utility resource planning should be to minimize the net present value of revenue requirements.

Q. Are the results of the MTRC test useful as well?

A. Yes. They are useful, and based on current policy in Colorado, the results of the MTRC test should be used to determine whether efficiency resources are cost-effective. I present the results of the Utility Cost test above because they best represent "ratepayer impacts," unlike the results of the RIM test.

Q. Do the results of the MTRC test indicate that the Company's energy efficiency programs are cost-effective?

A. Yes, the results of the MTRC test indicate that energy efficiency programs within all of the energy efficiency goal proposals are cost-effective. The BCRs range from 1.5 to 2.1, and the net benefits range from $297 million to $847 million. These are based on the Company's program cost assumptions; more reasonable cost of saved energy assumptions for the Sierra Club goals would produce even stronger results.

Q. Why is it so important that the energy efficiency cost reductions be presented in the way that you have presented them here?

A. In deciding the appropriate level of energy efficiency savings goals, the Commission needs to weigh several considerations. There is no question in this docket that the efficiency savings goals proposed by all parties are cost-effective, according to the results of the MTRC test and the Utility Cost test. However, the Company and the OCC have raised concerns that these efficiency initiatives might cause unacceptable rate impacts. Therefore, the ultimate question that the Commission needs to address in this docket is: Are the reductions in electricity system costs, and customers' bills, worth the potential increase in electricity rates? Section 5 provides relevant information on the potential

increases in rates, and this section provides relevant information on the likely reductions in costs.

Up until this point, I have relied entirely upon the results of the Company's own analysis. Before I offer recommendations for comparing cost reductions with rate impacts (in Section 8), I offer some additional findings and recommendations regarding the value of avoided air emissions.

7. THE VALUE OF AVOIDED AIR EMISSIONS

Q. Does the Company have an obligation to include the value of avoided emissions in its analysis of the costs and benefits of energy efficiency?

A. Yes. CRS 40-1-102(5) clearly requires the Company to consider the value of avoided emissions as one of the benefits of the energy efficiency programs.

Q. Does the Company recognize this obligation?

A. Yes, in response to a recent data request the Company notes that this statute requires that the value of avoided emissions be included in estimating the cost-effectiveness of DSM (Exhibit TW-33, Discovery Response WRA4-5).

Q. Can the value of air emissions affect the costs and benefits to electricity customers?

A. Yes, very much so. To understand this point it is important to make a distinction between two different values that can be ascribed to avoided emissions. The first is the cost associated with complying with current and future environmental regulations. These are costs that will be incurred by the Company and will therefore affect its revenue requirements and its customers' costs and bills. These costs should be included in the avoided costs used in all of the cost-effectiveness tests: the Utility Cost test, the MTRC test, and the RIM test (to the extent that this test is used at all). These costs include, for example: costs associated with retrofitting power plants to comply with EPA regulations, the cost of purchasing SO_2 or NO_X allowances, or the cost of purchasing CO_2 allowances.

It is important to note that all utilities should account for the avoided costs of compliance with environmental regulations, regardless of whether they are required to by statute. These costs are simply a part of operating the electricity system, and the utility must

include these costs along with avoided costs of energy, capacity, transmission, and distribution (see Ex. TW-4).

The second component of the value that could be ascribed to avoided emissions is the cost of environmental damage that may occur as a result of air emissions, after all environmental regulations have been complied with. These costs are often referred to as environmental externalities. One example includes health and environmental impacts that may result from SO_2 and NO_X emissions, even after a generation company has installed control technologies on their power plants and purchased any SO_2 or NO_X allowances that may be required. Another example includes climate change impacts that might occur from CO_2 emissions, even after a generation company has complied with current and anticipated future CO_2 requirements.

Q. How does the Company account for the value of avoided emissions in estimating the cost-effectiveness of DSM?

A. In response to a discovery request the Company notes that it assumed a value of zero for CO_2 emissions, based upon its 2012 Renewable Energy Standard Compliance Plan. The Company also notes that "because all of our programs are cost-effective with the $0 cost assumption, it does not impact our current plan" (Exhibit TW-2, p. 5-10, Discovery Response SC2-11). Consequently, the Company has not accounted for the value of avoiding costs of environmental compliance, nor has it accounted for any additional environmental benefits that might exist.

Q. Do you agree with the Company that the value of avoided emissions is not relevant here because all the efficiency programs are cost-effective anyway?

A. No, not at all. There are several reasons why it is important to properly capture the total avoided costs of the energy efficiency programs, and the costs of complying with environmental regulations are an important component of the total avoided costs. As I note above there is no question in this docket that the efficiency goals will be cost-effective; the question before the Commission is whether the reduced costs are worth the increased rates. The avoided costs will directly affect both the estimates of reduced costs and increased rates. If avoided costs are understated, by excluding the value of avoided environmental compliance costs, then the reduced costs will be understated and the

increased rates will be overstated. Unfortunately, this is the case in the Company's current analysis.

Q. Has the Company provided additional information about its assumptions regarding the value of avoided emissions?

A. In a recent discovery response the Company notes that one could consider the value of future avoided environmental compliance requirements as a non-energy benefit (NEB). In this way, this value is included in the MTRC test calculation. However, it is not included in the RIM test calculation (Exhibit TW-33, Discovery Response WRA4-5). Under this approach, the value of avoided environmental compliance costs is not included in the Utility Cost test either.

Q. Do you agree that the 10 percent non-energy benefits adder adequately captures the value of avoided air emissions from the efficiency programs?

A. No. It is not even close, for several reasons.

First, as I demonstrate in my answer testimony, the Company has significantly undervalued the non-energy benefits – even without including the avoided cost of environmental compliance as one of the NEBs. In my critique of the 10 percent NEB adder that the Company uses, I did not assume that the value included the avoided cost of environmental compliance. To add that particular benefit into the NEB adder only makes the 10 percent adder more understated.

Second, even if the Company were to assume that the 10 percent NEB adder was meant to represent only the avoided cost of environmental compliance, the value would be way too low. In Figure 6 below I compare the magnitude of the 10 percent NEB adder to actual estimates of the price of CO_2 emissions. As indicated, the full 10 percent NEB adder is well below these other estimates of CO_2 prices.

Third, the 10 percent NEB adder is only applied to the MTRC analysis; it is not included in the Utility Cost test or the RIM test analyses. Therefore, even if the 10 percent NEB adder were a reasonable approximation of the value of avoided air emissions, the Company's methodology would significantly understate the net benefits to customers indicated by the Utility Cost test and overstate that rate impacts indicated by the RIM test.

Q. How should the Company account for the value of reduced air emissions?

A. While there might be costs associated with several types of current and future emission requirements, I expect that complying with future CO_2 requirements will impose the most significant cost to the Company – costs that could be partially avoided through energy efficiency resources. The Company should apply the best estimate available of the likely costs of complying with state, regional, and national requirements regarding CO_2 emissions during the energy efficiency cost-effectiveness study period. While there is some uncertainty regarding the timing and magnitude of such CO_2 requirements, there is enough certainty to include reasonable estimates for planning purposes. Accounting for the cost of current and future CO_2 requirements is becoming standard practice in the electricity industry. In fact, Excel Energy accounts for the cost of future CO_2 requirements when undertaking efficiency planning for its Northern States Power Company subsidiary in Minnesota (Exhibit TW-29, p. 1-2, Discovery Response SWEEP5-5).

Q. What value should the Company place on CO_2 emissions?

A. The Company has developed forecasts of the future cost of CO_2 allowances. The most recent one that I am aware of was prepared as part of the Company's 2012 Renewable Energy Standard Compliance Plan, where PSCo provided a sensitivity analysis that included estimates of the future cost of CO_2. That analysis assumed a CO_2 allowance price of $20/ton beginning in 2014, escalating at seven percent annually. (Docket No. 11A-418E, 2012 Renewable Energy Standard Compliance Plan, May 13, 2011, Volume 1, Section 7, pp 4-5.)

Q. Is the Company's forecast of CO_2 costs reasonable to use for planning purposes?

A. The Company's forecast is certainly better than assuming that the future cost of CO_2 emissions will be zero throughout the study period. However, it is somewhat out of date, and it would be preferable to use a more recent forecast.

Q. What forecast should the Company use for the cost of CO_2?

Synapse Energy Economics periodically prepares a CO_2 price forecast that can be used for electricity resource planning purposes. The most recent forecast was prepared on November 1, 2013. (See Ex. TW-32, Synapse Energy Economics, *2013 Carbon Price*

Forecast, November 1, 2013.) This forecast estimates the likely cost of a federal requirement to limit CO_2 emissions, based on Synapse's assessment of the most recent federal initiatives addressing climate change, as well as a review of other industry forecasts of CO_2 prices. Because the forecast is based on federal CO_2 requirements, it is applicable in any state. Several states use the Synapse CO_2 price forecast for resource planning and energy efficiency planning purposes. I recommend that the Company use this forecast of CO_2 allowance prices in evaluating energy efficiency cost-effectiveness, as it is more recent than the Company's forecast and is a good reflection of current forecasts used in the electricity industry.

The Synapse CO_2 allowance price forecast includes a low, mid and high-case, recognizing the uncertainty associated with such forecasts. The mid-case forecast estimates that CO_2 allowance prices will begin in 2020 at $16 per ton, and escalate linearly after that to $79/ton by 2040 (in nominal dollars).

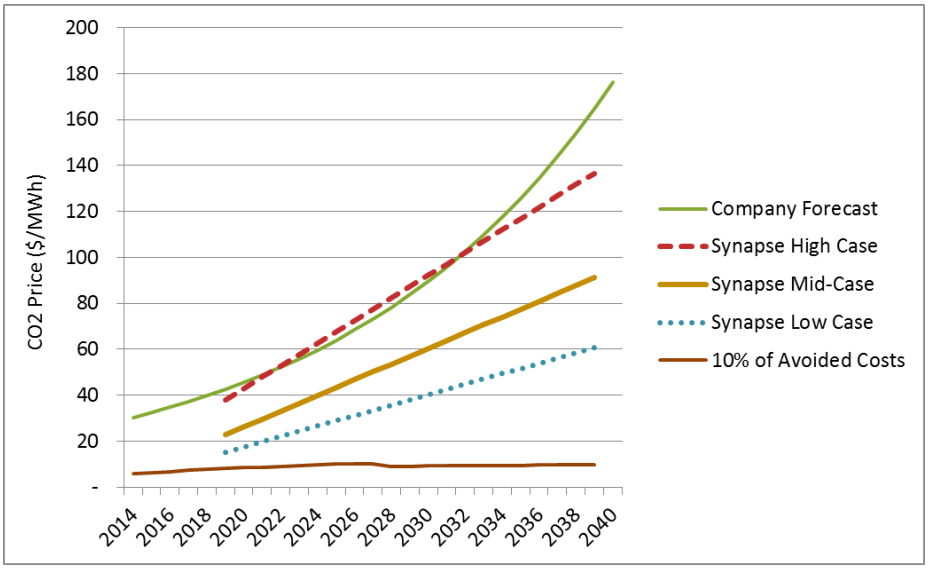
Q. Please provide a summary of the CO_2 price forecasts from the Company and from Synapse.

Figure 6 provides a summary of the CO_2 price forecasts of the Company and from Synapse, in terms of $/MWh.[7] The Synapse forecast assumes that some form of federal CO_2 constraints will be applied by 2020, and that the price of CO_2 will be $15/ton in 2020 and will increase linearly after that. The Synapse forecast also includes a high case and a low case. As indicated in the figure, the Company's CO_2 price forecast from the Renewable Energy Standard docket is comparable to the Synapse forecasts.

As discussed above, the Company has suggested that the cost of complying with future CO_2 requirements could be considered as being captured in the 10 percent NEB adder in the MTRC test. Figure 6 presents the CO_2 price that would be implied under the assumption that the 10 percent NEB adder reflects the *full* value of avoiding CO_2 emissions (i.e., that all the other NEBs have no value). As indicated, the NEB adder does not even come close to capturing the likely value of avoided CO_2 emissions, even if one were to assume that all of the other NEBs had zero value.

[7] The CO_2 prices in $/ton were converted into $/MWh using an emissions rate from a typical natural gas-fired combustion turbine. The values are in constant 2012 dollars.

Figure 6. Estimates of the Cost of CO_2 Emissions ($/MWh)



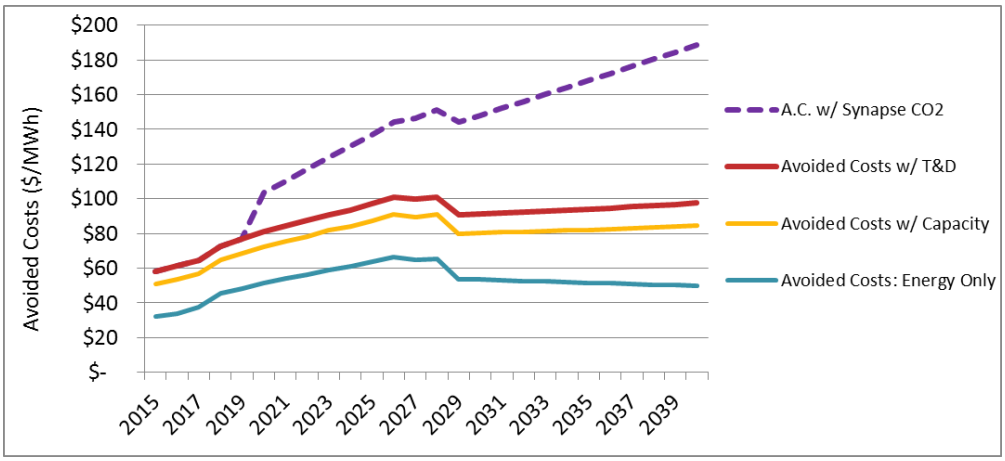
Q. How would these CO_2 values affect the avoided costs associated with the energy efficiency goals?

A. If the value of avoided CO_2 emissions were properly accounted for, they would significantly increase the costs avoided by energy efficiency. Figure 7 presents the impacts of CO_2 costs on the avoided cost assumptions used by the Company in this docket.[8] It includes the avoided costs for energy only, as well as the avoided costs including energy and capacity, and the total avoided costs including energy, capacity, transmission, and distribution costs. The Company's estimates of avoided costs reach roughly $100/MWh by 2025 and remain roughly constant after that.

Figure 7 also presents the total avoided costs if the value of CO_2 were properly accounted for, using the Synapse mid-case forecast. As indicated, including the value of CO_2 would significantly increase the estimate of avoided costs and therefore the value of energy efficiency.

[8] The values presented in Figure 7 are in constant 2012 dollars.

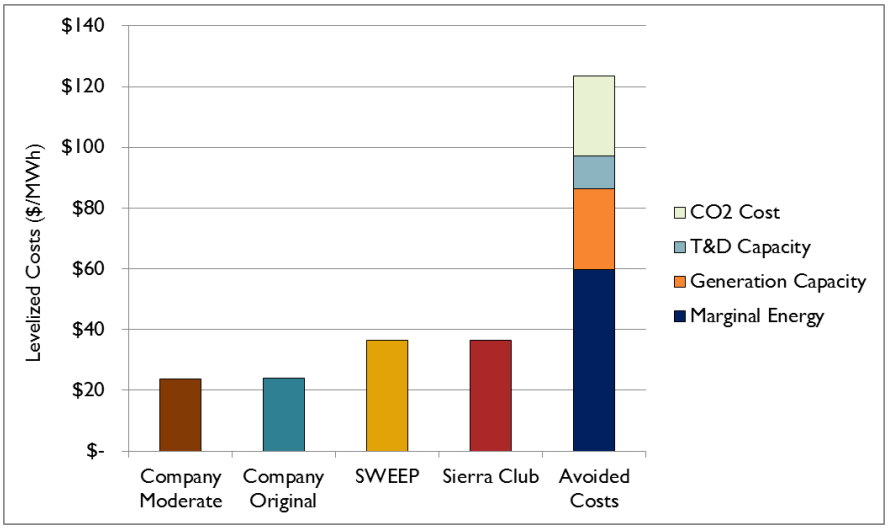
Figure 7. Impacts of Avoided CO_2 Emission Costs on Avoided Costs ($/MWh)



Q. How would these CO_2 values affect the levelized avoided costs?

A. Figure 8 presents the same levelized costs from Figure 3, with the levelized costs of CO_2 included. As indicated, the CO_2 costs will significantly increase avoided costs, making the energy efficiency programs even more cost-effective.

Figure 8. Levelized Avoided Costs Including CO_2 Cost ($/MWh)



Q. Are the CO_2 values presented above likely to affect utility costs and customer costs?

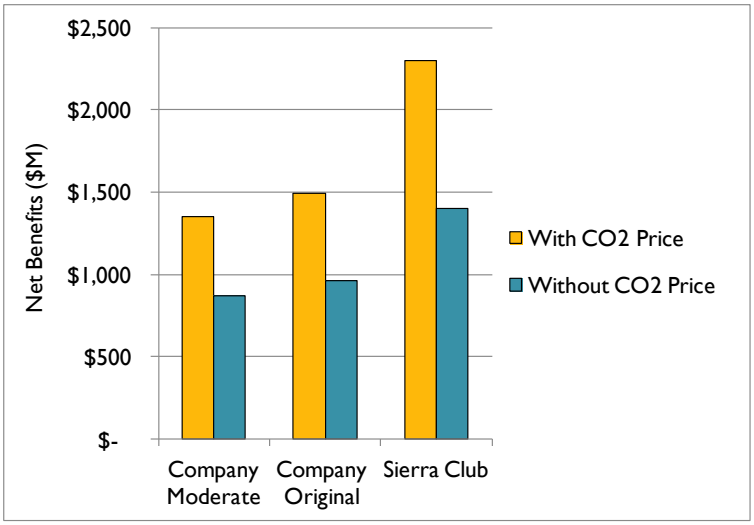
A. Yes, they would have a significant effect on utility and customer costs. Note that the CO_2 values used in this discussion so far are for the estimated cost of complying with future federal environmental regulations. These are costs that will be incurred by the Company, will become a part of their revenue requirements, will be passed on to customers, and will

become a part of electricity prices and customer bills. These are not estimates of the cost of environmental damages, i.e., they are not environmental externalities.

Q. How would the CO_2 values presented above affect the results of the cost-effectiveness analysis?

A. If the value of avoiding CO_2 emissions were properly accounted for they would have a significant effect on the key information in this docket. First, they would increase the energy efficiency benefit-cost ratios and the net benefits estimated under the Utility Cost test and the MTRC test. This is indicated in Figure 9, which shows the impact of the CO_2 value on the net benefits of energy efficiency, using the Utility Cost test results.

Figure 9. The Impact of CO_2 Values on the Net Benefits of Energy Efficiency ($million)



Second, properly accounting for the value of avoiding CO_2 emissions would significantly decrease the energy efficiency rate impacts, regardless of which methodology is used to estimate rate impacts.

In sum, by excluding the avoided cost of CO_2 emissions, the Company has significantly understated the cost savings and overstated the potential rate impacts of the efficiency scenarios.

8. CONCLUSIONS AND RECOMMENDATIONS ON EFFICIENCY GOALS

Q. Are the Company's efficiency programs likely to be cost-effective?

A. Yes. There is no question that the Company's efficiency programs will be highly cost-effective and will reduce electricity costs to customers, under all of the goals scenarios proposed by the parties in this docket. This is indicated by the results of the MTRC test, which is the primary test to be used in Colorado, and it is also indicated by the results of the Utility Cost test, which provides an additional important indication of ratepayer impacts.

The Company's efficiency resources will be cost-effective under the Company's own assumptions of costs and benefits. Using more reasonable estimates of the cost of saved energy, and using appropriate estimates of the value of avoided emissions, would indicate that the efficiency programs are even more cost-effective.

Q. If the programs are so cost-effective, then what is the Company's primary argument for not adopting the Sierra Club's energy savings goals?

The Company relies upon two key arguments for limiting the energy efficiency goals. First, PSCo claims that efficiency savings beyond its original goal proposal may not be achievable. I address this issue in Section 3.

Second, PSCo claims that increased efficiency savings may result in unacceptable rate impacts. In its rebuttal testimony the Company proposed a more moderate savings goal to address this concern.

Q. Should concerns about rate impacts be used to limit the energy efficiency goals in this docket?

A. No. As I mention above, rate impacts are an important consideration in setting efficiency goals. However, rate impact considerations should not be based on the results of the RIM test. Instead, they should be based on meaningful information, and they must be considered in the context of the benefits associated with the efficiency savings. The information available in this docket demonstrates that:

- The long-term rate impacts from the efficiency programs are likely to be negligible to modest, regardless of which efficiency goals the Commission approves.

- These rate impacts are likely to be more than offset by reduced bills for the vast majority of customers.

- Higher efficiency goals will result in higher customer participation, thereby enabling a larger portion of customers experience bill reductions from the efficiency programs.

Furthermore, the Commission should never lose sight of the significant benefits that efficiency programs offer to customers. In particular:

- The Company's proposed efficiency goals are expected to reduce costs to customers by roughly $875 million (moderate proposal) to $966 million (original proposal), under the Company's own assumptions. The actual savings will likely be significantly higher than this due to the value of avoided CO_2 emissions.

- My proposed efficiency goals are expected to reduce costs to customers by roughly $1.4 billion without accounting for CO_2 emissions, or as much as $2.3 billion if CO_2 emissions are accounted for.

- Consequently, my proposed energy efficiency goals, relative to the Company's moderate proposal, are expected to save customers by roughly $437 million, without accounting for CO_2 emissions, and roughly $805 million if CO_2 emissions are accounted for.

Q. Are there other factors that the Commission should consider when setting efficiency goals?

A. Yes. It is important to recognize that energy efficiency offers significant benefits to all customers, regardless of whether they participate in the efficiency programs or not. These benefits include reduced capital investment in generation, transmission and distribution infrastructure.

They also include reduced risk and increased reliability. The combined impacts of the energy efficiency programs offered by the six New England states has resulted in completely eliminating load growth in the region for at least the next ten years, according to the Independent System Operator in New England. With load growing at low rates, or not growing at all, utilities and regulators have more time to weigh a broader variety of

options before undertaking major investments such as new generation or transmission facilities. This additional flexibility can offer tremendous value to the utility and its customers, by reducing the risks associated with expensive new investments.

Increased levels of efficiency can also reduce the risks associated with future environmental regulations, particularly carbon regulations. Regardless of whether the Commission adopts my recommendations above regarding the value of CO_2 emissions, there is no question that energy efficiency resources reduces risks associated with increasingly stringent, and increasingly costly, environmental regulations over time.

Q. Please summarize your recommendations.

A. I recommend that the Commission adopt the Sierra Club's proposed efficiency goals. These goals are reasonable, achievable, highly cost-effective, will provide significant reductions in electricity costs to PSCo customers, and will not result in undue rate impacts.

In addition, I recommend that the Commission reject use of the RIM test for evaluating the cost-effectiveness of energy efficiency programs or energy efficiency goals. Instead, if the Commission is concerned about the rate impacts of energy efficiency, the Company should be required to provide comprehensive, meaningful analyses of the long-term rate, bill and participation impacts of energy efficiency programs.

Furthermore, I recommend that the Commission require the Company to include the cost of compliance with environmental regulations, including reasonably anticipated future regulations, in all future evaluations of the cost-effectiveness of energy efficiency. This cost of compliance should be based on the best information available regarding the most likely future costs.

Finally, I reiterate two recommendations from my answer testimony. First, the Commission should require the Company to adopt the non-energy benefit values that I propose in my answer testimony. Second, the Commission should open a separate docket to investigate the advantages and disadvantages of revenue decoupling as a means to align the Company's financial incentives with the state's energy policy goals.

Q. Does this conclude your surrebuttal testimony?

A. Yes, it does.